13.4.1 University target date by which it will become carbon neutral according to the Greenhouse Gas Protocols

Alexandria University's sustainability documentation identifies a carbon-reduction target covering Scope 1 and Scope 2 emissions by at least 2050. There is an important academic distinction: 2050 is the reported target horizon for Scope 1 and 2 reductions. It should not automatically be described as a verified commitment to eliminate all Scope 1, 2 and 3 emissions.

carbon-footprint (tonnes of CO_2 equivalent) = 3,040.60 (2024–2025 academic year)



Faculty of Pharmacy Green Cycle project award ceremony



University solar photovoltaic installation

ALEXANDRIA UNIVERSITY'S ROADMAP TOWARD CARBON NEUTRALITY BY 2050

Institutional Carbon Reduction Target, Greenhouse Gas Accounting, and Sustainability Progress

Alexandria University has established a long-term direction toward carbon reduction and carbon neutrality, with 2050 identified in its published sustainability documentation as the target horizon for reducing Scope 1 and Scope 2 emissions.

The university has been monitoring its carbon footprint since the 2018/2019 academic year. Its sustainability programme includes renewable energy deployment, energy-efficiency improvements, green-campus initiatives, environmental awareness, and carbon-footprint assessments.

According to the university's 2024/2025 sustainability report, its institutional carbon footprint decreased from 7,541.33 tonnes of CO_2 equivalent (tCO_2e) in 2020/2021 to 3,040.60 tCO_2e in 2024/2025, representing a reduction of approximately 59.7%.

The university's published sustainability portal also identifies a document concerning its target date for becoming carbon neutral according to the Greenhouse Gas Protocols and a separate document concerning carbon-reduction targets covering Scope 1 and Scope 2 emissions by at least 2050.

This report examines the 2050 target, the university's emissions performance, the relevance of the Greenhouse Gas Protocol, and the measures required to achieve a credible net-zero transition.

Alexandria University's Carbon Neutrality Target: 2050 is the target horizon identified in Alexandria University's published carbon-reduction documentation for Scope 1 and Scope 2 emissions. This should not be interpreted as independent verification that all Scope 1, 2, and 3 emissions will reach zero by that date.

The publicly available evidence reviewed for this report supports the 2050 target horizon, particularly for Scope 1 and Scope 2. The full scope and exact residual-emissions criteria should be confirmed against the university's underlying target document.

The Greenhouse Gas Protocol and Its Application

The Greenhouse Gas Protocol is an internationally recognized framework for measuring and reporting greenhouse gas emissions from organizations.

It provides a consistent approach for identifying emission sources, establishing organizational boundaries, calculating emissions, and monitoring progress.

For Alexandria University, this framework is important because the university operates multiple faculties, research institutes, administrative buildings, laboratories, and other facilities.

The GHG Protocol categorizes organizational emissions into three principal scopes.

Scope 1: Direct Emissions

Scope 1 includes emissions from sources owned or controlled by the university.

Examples include:

- Fuel combustion in university-owned boilers and generators.
- Fuel consumption by university-owned vehicles.
- Direct emissions from refrigeration and air-conditioning equipment.
- Other direct greenhouse gas emissions from university operations.

Reducing these emissions requires improved equipment efficiency, vehicle management, refrigerant control, and cleaner fuel alternatives.

Scope 2: Indirect Energy Emissions

Scope 2 covers indirect emissions associated with purchased electricity, steam, heating, and cooling consumed by the university.

For Alexandria University, electricity consumption in classrooms, laboratories, administrative buildings, hospitals, and research facilities represents an important area for emissions reduction.

Possible measures include:

- Installing solar photovoltaic systems.
- Improving lighting efficiency.
- Upgrading air-conditioning systems.
- Improving building insulation and energy management.
- Monitoring electricity consumption across university facilities.

Scope 3: Other Indirect Emissions

Scope 3 includes other indirect emissions throughout the university's value chain.

Examples include:

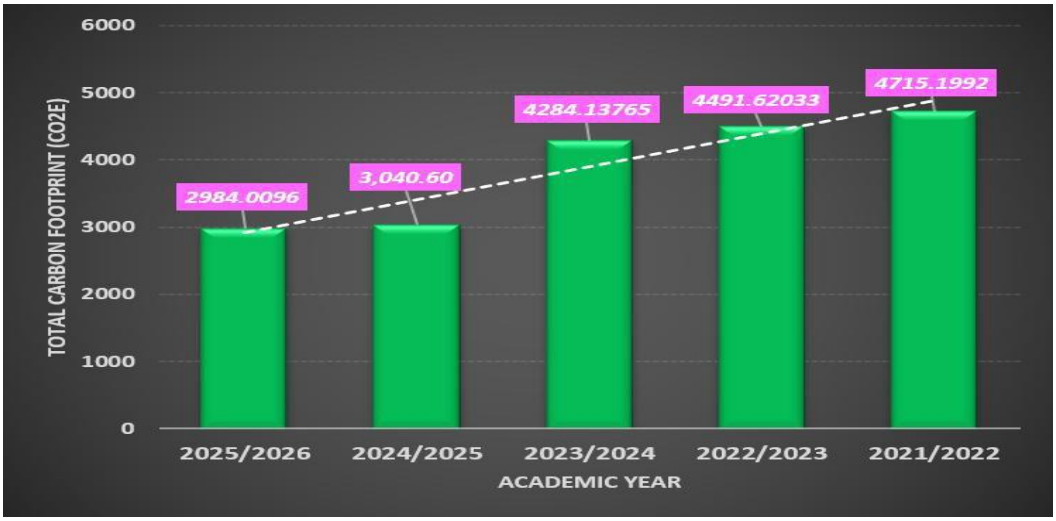
- Student and employee commuting.
- Business travel and air transportation.
- Waste generation and disposal.
- Purchased goods and services.
- Water supply and wastewater treatment.
- Construction and procurement activities.

A comprehensive institutional net-zero strategy should address these emissions as well, even when the university's published reduction target specifically focuses on Scopes 1 and 2.

- **Alexandria University's Carbon Footprint Performance**

  Alexandria University has published carbon-footprint assessments covering multiple academic years. The reported figures demonstrate a substantial downward trend.

Academic year	Carbon footprint (tCO_2e)
2020/2021	**7,541.33**
2021/2022	**4,715.20**
2022/2023	**4,491.62**
2023/2024	**4,284.14**
2024/2025	**3,040.60**



The reported reduction between 2020/2021 and 2024/2025 is approximately 59.7%.

This improvement reflects the university's reported progress in energy efficiency, renewable electricity, and sustainability management.

However, the figures should be interpreted with reference to the reporting boundaries and calculation methods used in each academic year. A reduction in total reported emissions does not by itself establish that the institution has achieved net zero.

- **Renewable Energy and Carbon Reduction Initiatives**

  Alexandria University has developed several initiatives supporting its transition toward a lower-carbon campus.

  Solar Energy Installations

  The university has documented renewable energy facilities at the Faculty of Agriculture, Abis Campus, and its main university building.

  Its sustainability documentation also records a 220-kilowatt solar photovoltaic installation on the rooftop of the Mechanical Engineering Department at the Faculty of Engineering.

  Solar energy can reduce Scope 2 emissions by replacing electricity purchased from carbon-intensive sources.

  Energy Efficiency

  The university has reported improvements in electricity and natural gas consumption.

  Its 2024/2025 sustainability reporting identifies a 6.42% decrease in electricity consumption compared with the previous reporting year and a 70% reduction in natural gas usage.

  These measures can help reduce both direct and indirect greenhouse gas emissions.

  Green Campus Initiatives

  The Faculty of Pharmacy's Green Cycle initiative provides an example of integrating sustainability into daily university activities.

  The initiative promotes shared transportation and reduced individual vehicle use.

The university has also participated in green-campus initiatives, environmental education, and projects supporting sustainable resource management.

Sustainability Office and Renewable Energy Unit

On 19 March 2026, Alexandria University announced the establishment of a Sustainability Office and a Renewable Energy Unit.

These institutional structures are intended to strengthen environmental policies, promote clean technologies, expand renewable energy use, and coordinate sustainability activities across the university.

They provide an important organizational foundation for implementing the university's long-term carbon-reduction objectives.

Renewable Energy Sources in Campus: 1,228,291.2 kWh/year

Renewable energy sources and technologies supporting energy generation and combined heat applications include:

1) **Solar Thermal Systems:** Solar collectors generate renewable thermal energy to support heating and hot water demands and complement building energy systems.
2) **Wind Energy:** Wind turbines convert wind energy into renewable electricity to support campus operations and reduce dependence on conventional energy sources.
3) **Biodiesel Production:** Biodiesel derived from biological feedstocks such as plant oils, used cooking oil, and other renewable organic materials serves as a cleaner alternative fuel for energy generation and operational activities.
4) **Green Hydrogen:** Hydrogen produced through water electrolysis using renewable electricity (e.g., solar or wind power) serves as a clean energy carrier that can support electricity generation, thermal applications, and future low-carbon energy systems, including CHP applications where implemented.
5) **Biomass Energy:** Biomass utilization includes advanced conversion technologies such as carbonization, torrefaction, gasification, pyrolysis, and biochar production, contributing to renewable energy generation and efficient resource utilization.
6) **Waste-to-Energy Systems:** Organic or biodegradable waste is converted into useful energy, with CHP applications enabling simultaneous production of electricity and recoverable heat.
7) **Together, these renewable energy technologies contribute to increasing renewable energy production, improving energy efficiency, reducing greenhouse gas emissions, and supporting sustainable campus development and smart building implementation.**

	
Automatically Controlled Biodiesel Production Unit. (Faculty of Engineering, Alexandria University)	Activated carbon cloth from biomass fibrous resources (Faculty of Engineering, Alexandria University)
	
Design and Fabrication of Biodiesel Burner test rig. (Faculty of Engineering, Alexandria University)	Green Hydrogen/Diesel Dual-Fuel Retrofit: A Scalable Pathway to Industrial Decarbonization (Faculty of Engineering, Alexandria University)
	
Design of Integrated Augmented Vertical Axis Wind Turbine (VAWT) With Solar Energy System for High Rise Urban Applications (Faculty of Engineering, Alexandria University)	Experimental and Simulation Study of Natural Gas–Hydrogen/Diesel RCCI for Engine Decarbonization (Faculty of Engineering, Alexandria University)



Solar Energy Center at the Faculty of Agriculture (Alexandria University)



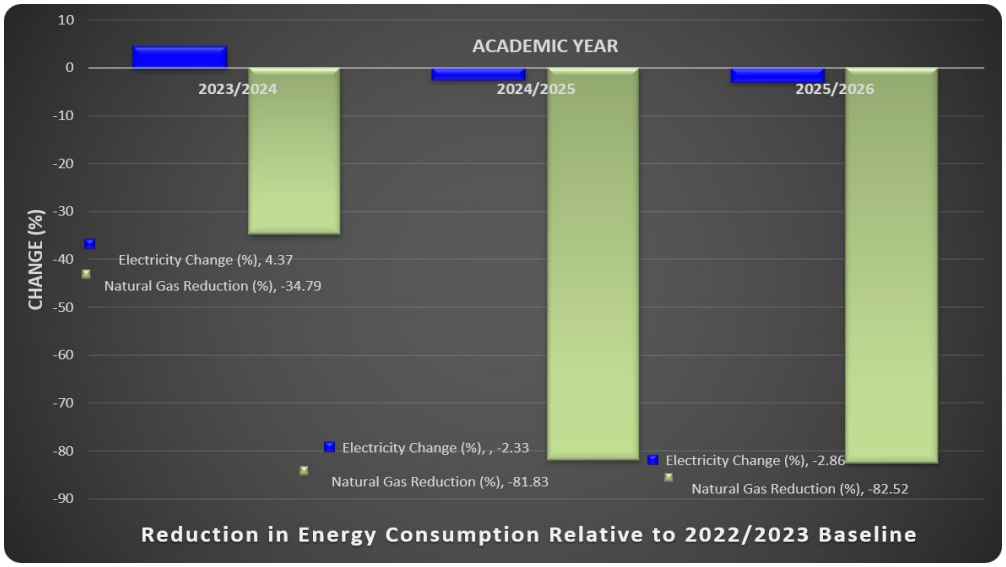
Windmill and Solar Panels (Solar Energy Center at the Faculty of Agriculture - Alexandria University)

- Alexandria University has developed a comprehensive framework of 26 innovative projects and programs that promote renewable energy, energy efficiency, climate change mitigation, and sustainable resource management. These initiatives integrate education, research, infrastructure, and community engagement through renewable energy centers, solar and wind power systems, green building technologies, biofuel research, circular economy projects, and international academic partnerships. The University operates renewable energy centers at the Faculty of Agriculture, Faculty of Science, and Faculty of Engineering, where hybrid solar-wind systems, photovoltaic installations, and building-integrated photovoltaic technologies support both campus operations and applied research. In addition, Alexandria University offers specialized postgraduate programs in climate change, sustainable fisheries, natural resource sustainability, and the blue economy through Erasmus+ and other international collaborations. Campus sustainability projects, including the Green Cycle initiative, greywater recycling, energy-efficient buildings, solar power stations, and plastic recycling laboratories, further demonstrate the University's commitment to reducing carbon emissions, improving resource efficiency, and preparing graduates to address global environmental challenges.



Car pooling application for smartphones - Green Cycle project in the Faculty of Pharmacy (Alexandria University, Egypt)

- Alexandria University continues to enhance energy efficiency through targeted energy management initiatives and infrastructure upgrades. Compared with the 2022/2023 baseline, natural gas consumption decreased significantly by 34.79% in 2023/2024, 81.83% in 2024/2025, and 82.52% in 2025/2026. Electricity consumption also declined by 2.33% in 2024/2025 and 2.86% in 2025/2026, following a temporary increase of 4.37% in 2023/2024. These results demonstrate the University's ongoing commitment to reducing energy consumption, improving operational efficiency, and lowering greenhouse gas emissions in support of the Sustainable Development Goals and Egypt's Vision 2030.



- The University has established 22 sustainable transportation initiatives designed to reduce private vehicle use and greenhouse gas emissions. These include shuttle services, carpooling programs, bicycle parking facilities, pedestrian-friendly campus design, awareness campaigns, sustainable mobility competitions, smart parking management, and incentives encouraging environmentally responsible travel. Together, these initiatives help decrease traffic congestion, improve campus safety, and enhance environmental quality.

- **Proposed Roadmap Toward 2050**

  To strengthen the implementation of its published target horizon, Alexandria University should maintain a measurable, university-wide carbon-reduction roadmap.

  The following stages are recommendations rather than confirmed university deadlines.

  2026–2030: Measurement and Governance

  - Establish a consistent university-wide GHG inventory.
  - Confirm the organizational and operational boundaries.
  - Document Scope 1, Scope 2, and relevant Scope 3 emissions.
  - Establish a verified emissions baseline.
  - Publish annual carbon-reduction progress reports.
  - Strengthen the role of the Sustainability Office.

  2031–2040: Accelerated Decarbonization

  - Expand solar energy installations.
  - Improve energy efficiency across faculties.
  - Electrify suitable university vehicles.
  - Improve refrigerant management.
  - Introduce sustainable procurement practices.
  - Reduce waste and transportation-related emissions.

  2041–2050: Deep Emissions Reduction

  - Further reduce remaining fossil-fuel consumption.
  - Expand renewable electricity procurement.
  - Improve energy management across all university facilities.
  - Address remaining indirect emissions.
  - Independently verify the institutional GHG inventory.
  - Demonstrate compliance with the university's approved net-zero criteria.

  The 2050 milestone should be supported by annual progress indicators and transparent reporting.